# REPORT ON MINERALIZATION OF GROUND AND SURFACE WATERS OF THE SOUTH PLATTE WATER IN COLORADO

by

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and
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## FOREWORD

The work under this project was done cooperatively between the Chemistry and Civil Engineering Sections of the Colorado Agricultural Experiment Station. It was initiated by J. W. Tobiska as leader of the then Chemistry Section (1943) under his Project No. 1 approved September 1, 1943. The original project number assigned by the Civil Engineering Section was C.E.-B6 but as of the date of this report (1952) it is known as Number 114. The collection of water samples and preparation of this report (1951) was done by W. E. Code. Chemical analyses were made by J. W. Tobiska and associates during the years 1943, 1944, and 1945. This report is substantially that of presenting the water analyses and the location of the points of sampling.

## Reasons for Undertaking Survey

The use of saline and alkali waters for irrigation is common in the West. Its use has had a history of varying effects on soils. Whether it has been detrimental or not has depended upon the character of the salts, their concentration, the character of the soil and methods of applying water. In some instances no particular damage to the soils

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has been observed but in others, lands have been either abandoned or seriously affected due to salt concentration. The severe cases have usually been associated with high water tables. Relatively high concentrations when the sodium content is low may be used safely on a permeable soil when the movement of moisture is principally downward. If unwise irrigation practice is employed with highly saline waters on many soils, difficulties can be expected. This is particularly applicable to sprinkler irrigation in which only light applications might be the rule.

Clays have the property of adsorbing calcium, magnesium, sodium and other ions. If an excess of sodium ions is adsorbed by the clay particles, much damage is done to the physical character of the soil and a direct effect on plant growth is possible. One criterion used in connection with the acceptibility of saline irrigation water is that the percentage of sodium should not exceed roughly 50 percent of the total dissolved solids when the total concentration reaches about 2000 p.p.m. Waters containing more than about 2000 p.p.m. total dissolved solids regardless of sodium content should be regarded as of doubtful quality for use on some soils.

Much of the return water used in Colorado contains a fairly heavy concentration of salts as does the ground water in certain localities. Except in a few instances where high water tables are involved, it has not been demonstrated that Colorado soils have been greatly affected. No research of a continuing character has been carried on to discover whether changes are occurring in the soils. Such a study would have to be of a rather lengthy and costly nature. Since water analyses are part of the problem and not quite so involved, it was decided that such a survey be made (~~profitably~~) in the South Platte Valley. A knowledge of water quality would have immediate value as well as becoming a basis for comparison with any future surveys of a similar character. It was anticipated upon the initiation of this project that further duplicating surveys would be made in the future to determine whether irrigation waters were changing in character through the years.

## GENERAL CONSIDERATIONS

When new lands come under an irrigation program one result is a rising water table. Should underdrainage be inadequate the water table may reach the land surface and waterlog the soil. Salts in solution then concentrate at the surface usually destroying it for agricultural purposes. When underdrainage is good, the water table may not rise to the surface but escape into stream channels. Salts leached from

the soil are carried away with the escaping stream. Good drainage is therefore essential in an irrigated area. If the natural conditions are inadequate artificial drains must be installed. Should such salt laden waters be again used for irrigation, some of the salts may be redeposited in soils farther downstream. Through evaporation and plant use, some of these salts may lodge in the soil with detrimental results. The history of irrigation in the South Platte in Colorado is that of the appearance of return water in streams not long after its inception. Return water is used and reused extensively in the lower reaches of the South Platte.

It is reasonable to suppose that mineralization changes have occurred and are still occurring in the soils and in the ground water producing changes in the quality of water in the streams. Whether these changes are in the direction of increase or decrease is not known because no investigation has been made along this line. One might suppose that mineralization might reach a peak and then improve as time went on. Certainly the leaching effect of irrigation on soils should be greater in the beginning. However if all the water is consumed by reuse and through transpiration and evaporation, none will move out of the state. This is nearly the truth in the South Platte in that roughly only about 10 percent of the water originating in the basin, large floods excepted, passes out of Colorado at the state line. The result might be thought of as salt removal from the upper areas to the lower areas through the reuse of return waters.

Is there a threat to the State's irrigated agriculture through translocation of salts or the continued use of salt laden waters? Not much is known about such matters since much time must pass before some effects become apparent. What changes are to be expected in mineral content of ground waters that would affect their use for human consumption? Many municipalities and a large farm population depend upon such sources. What changes will occur through the importation of additional water into the basin from the Western slope? These are only some of the questions upon which there is no information. The changes are probably subtle and many years must pass before significant changes become apparent. Therefore it has been thought advisable to start gathering such data fully realizing that much time, several generations perhaps, will pass before any trends are observable. To make such data useful, the survey must be repeated at intervals. It has been thought that 10 years might be an appropriate interval.

## COMMENTS ON CONDUCT OF SURVEY

Mistakes and omissions have probably occurred in selecting sources of samples. Some sources may have no significance. Perhaps an insufficient number was taken. Some of these deficiencies can be corrected in the next survey. Among surface samples, perhaps some should have been taken from Bear Cr., Clear Cr. and Boulder Cr. Instead of spring and fall sampling, perhaps samples should be taken on the basis of stream-flow variation. Only 2 drains were sampled. More would be advisable.

Samples from idle irrigation wells taken by submerging a quart milk bottle may possibly be questioned. The milk bottle sampler was held in a weighted steel cage supported by a long rope. It was lowered rapidly to points much below the water surface in taking a sample. It is believed that samples taken while the well is being pumped would be better. Such conditions obtain only during the irrigation season and many useless trips might be necessary before a visit would coincide with a pumping period. Much of the sampling in this survey was done in connection with other work to save travel expense. Some of the wells chosen are questionable as to their truly representing much area or a general condition. Numbers 73, 78, 76 and 56 are particularly suspect.

The program of sampling envisioned the bracketing of an irrigation season with a spring and fall sampling, making 4 in all. Sampling started in the fall of 1943 and ended in the spring of 1945. Four samples were taken from most sources but many were limited to 3 and from some only 1 or 2. It may well be that 2 samples from wells are sufficient and that those taken from stream flow should be at least 4 in number and distributed according to the amount of water in the stream. It would be well to choose a normal season of run-off as indicated by snow surveys.

## COMMENTS ON ANALYSIS DATA

### Stream Flow

The salt content of the waters in streams issuing from the mountains is generally very low. The highest content found on 4 streams was 257 parts per 1,000,000 but the average is more in the neighborhood of 100 parts per 1,000,000. As groundwater return becomes effective the salt content increases. On the main stem of the South Platte during periods of normal flow

there is a progressive increase in salt content as far as Kersey. Below this point no consistent increase is apparent; in fact in the lowest reaches a small decrease may exist. Fig. 1 shows these conditions graphically.

The Cache la Poudre, Big Thompson and St. Vrain seem to pick up salts at a faster rate than the main stem. On each of these tributaries the salt concentration near the mouth was as great or greater than for any station on South Platte itself. The discharge of these waters into the main stream accelerates the concentration between Platteville and Kersey but the actual concentration is less because of dillution by the larger stream flow.

As the discharge of all streams increases on the arrival of the spring snow melt or from local storms, the concentration of salt drops. This condition is obvious from inspection of the tabulated data. The salt content of the stream at the time of sampling however has no logical or consistent relationship to the total salt being carried by the stream. One principal reason for the existence of this condition is that of the diversion of water by the many ditches along the courses of all streams. Thus two water samples taken at a station as practically the same discharge may have a considerable difference in salt concentration. With such a factor greatly influencing the results, relationships between salt content and volume of flow are not to be expected. It will therefore be practically impossible to detect with any assurance of accuracy changes that might occur in the future unless those changes are of considerable magnitude.

## Drain Water

Samples of water were taken from two drains. No. 79 is from a farm tile drain and is on the same farm from which well water sample No. 78 was obtained, 5 miles northwest of Longmont. This water, although containing about 2100 parts per million total solids, has but about half the salt content as the nearby well. The water in the well is influenced by the marine deposited Pierre shale. No. 16 is from an open drain about 3 miles long near La Salle and has a sustained flow of over 15 cubic feet per second. This water is almost identical with that of the LaSalle well No. 30. In the first case sub-surface drainage conditions are very poor while in the second the conditions are excellent.

## Reservoirs

The quality of waters contained in reservoirs is rather constant and generally is in accord with the composition of the waters at the point of diversion. Two exceptions to this are evident. The salt content of water in Reservoir No. 6 (sample No. 72) is much higher than that of the diverted water. This reservoir receives water through Reservoir No. 5 which is supplied through long and devious channels from the North Fork of the Poudre and passes through mineral laden soils. It also receives water from Reservoir No. 2 which is fed from the Poudre direct. The result is a water containing 2 to 3 times as much as that of Terry Lake (sample No. 74). New Windsor Reservoir (sample No. 60) may be affected in a similar manner since the salt content is significantly higher than Terry Lake and their points of diversion are only 2½ miles apart. It is possible however that more return water flows into New Windsor since its point of diversion is downstream.

One sample from Milton Reservoir (No. 59) was taken in very shallow water as the reservoir was being filled. It is quite probable that salts leaching out of the soil had increased the salt content above the average for the entire reservoir contents. Possibly the sample should be discarded for this reason.

Riverside, Empire, Prewitt and Julesburg Reservoirs are filled with waters composed very largely of return flow. The salt content of the waters impounded in these reservoirs closely follows the composition of the waters in the stream at the point of diversion. They no doubt reflect closely the average character of irrigation water used below Kersey.

## Ground Water

In nearly all cases (exceptions No. 73, No. 78, No. 34) wells from which samples were taken are located in areas where water bearing gravel occurs in such thickness that irrigation wells are possible. Generally the samples represent either the first water encountered or a mixture of waters above the shales or sandstones. Exceptions to these are No. 58 where the water is drawn from a stratum at 75 feet and No. 46 where the water is drawn from a stratum at 115 feet and No. 30 at 65 feet.

Variation in quality between water bearing gravels separated by extensive impervious strata is common especially in an irrigated district. Downward percolating waters from irrigation canals and from irrigated fields tend to increase

the salt content of the first waters encountered. If the separation consists of local lenses of clay only, then there will probably be little change in the chemical composition of the water throughout its depth. Groundwater movement in the Valley of the South Platte in Colorado so far as information is now available, is in the general direction of the surface drainage. In the central part of the valley trough, the flow is in the direction of the trough. At the valley sides where the water table is higher than the stream bed, the flow will be towards the valley trough. This situation permits percolating waters from beyond the valley terraces to under-run other waters of local origin. Such waters when not originating in irrigation areas are usually of better quality than those beneath irrigated lands. Thus wells drawing water from the deeper strata often produce water of better quality than shallower wells. No wells sampled represent this condition so far as is known.

One might think that mineralization of ground waters in an irrigated area would increase as distance increased from the points of first application. In case of the South Platte the waters issuing from the mountains are quite pure. A very large part of these waters is diverted close to the mountains and losses from the canals and reservoirs return to the stream at points lower down. These return waters have picked up salts in the soils and therefore become highly mineralized in a short distance from the first diversions. Return waters as they accumulate or mix with other waters are rediverted for use farther downstream and it is not at all improbable that some parts of the original supply is used three or four times. The expectation then is that both ground waters and surface flow in the main channel would contain increasing amounts of dissolved minerals. This is true only in a broad way according to the findings of this survey.

The underlying shales of the South Platte Valley are geologically the Laramie and Pierre formations of the Upper Cretacious. The latter was laid down in salt water and therefore highly mineralized and being practically impervious, has retained these minerals. Soils derived from such formations contain these salts in varying degrees. Because of these conditions very highly mineralized gound waters are found close to the mountains especially where underdrainage is poor. Samples No. 73 and No. 78 particularly illustrate this. Sample No. 67 comes from an area underlain with Pierre shale and probably explains the high salt content here.

The best ground water discovered in this survey was on Box Elder Creek northeast of Denver, No. 22, and another in the southern part of Prospect Valley. The underlying rock in

this area is the Denver formation, not laid down in salt water. Number 56 is at the boundary of the Denver and Laramie and should be of fair quality. No explanation is available as to why it is not. Better quality was found lower down on the Bijou (Nos. 37, 38, and 81) where the alluvium is underlain by the Laramie and Fox Hills. The ground water of the Bijou and Box Elder should be largely derived from surface flows which are of good quality as are the waters contained in the Laramie and Fox Hills which may outcrop in these areas.

In Prospect Valley the increasing mineralization from south to north can be accounted for by irrigation. It is probable that the source of water in the case of No. 58 is not influenced by this irrigation as it comes from below an impervious clay and is several miles below the last irrigation and not in the direct path of ground water flow from the irrigated area.

Inspection of the data and Fig. 2 show an increasing salt content of the ground waters of the main stem of the river and tributary valleys as far down as Kersey. Below this point the salt content follows no particular pattern. Sample No. 40 shows a very heavy mineralization while that of No. 44, 48 miles farther down stream shows less than those samples at or just below Kersey. It appears that local conditions greatly influence water quality and that irrigation may not be solely responsible for high mineralization.

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# LOCATION AND DESCRIPTION OF SOURCES OF WATER SAMPLES

## RIVER WATERS

### South Platte River

| Sample No. | |
|---|---|
| 26 | Taken from Highline Ditch 0.6 mi. south of Watertown. This is bypassed water and is immediately returned to the river. Gaging station nearby. |
| 1 | Taken from bridge over river at west edge of Littleton. Gaging station. |
| 3 | Taken from bridge over river on Colorado Highway 224 just below Burlington Dam at north city limit of Denver. Water quantities are those at gaging station 3 miles above. |
| 6 | Taken from bridge over river on Colorado Highway 7 just west of Brighton. Water quantities are averages of Henderson and Ft. Lupton gaging stations. |
| 20 | Taken from bridge over river on road ½ mile north of Platteville. Water quantities are those at Ft. Lupton 10 miles upstream. |
| 15 | Taken from bridge over river 1 mile east of Evans. Water quantities are estimates by Code. |
| 10 | Taken from bridge over river on Colorado Highway 37 2 miles north of Kersey. Gaging station. |
| 43 | Taken from bridge over river 3½ miles west of Orchard. Gaging station. |
| 42 | Taken from bridge over river at north edge of Ft. Morgan. Gaging station. |
| 23 | Taken from bridge over river on U. S. Highway 6, 1½ miles west of Merino. Water quantities are those at Balzac gaging station 6 miles above. |
| 49 | Taken from bridge on U. S. Highway 6 over river east of Sterling. Sample taken from east one of 3 channels because others contain sugar factory waste. Water quantities are estimates by Code. |
| 48 | Taken from bridge over river on State Highway 25, one mile south of Crook. Water quantities estimated by Code with reference to Julesburg gaging station. |

36 Taken from bridge over river on State Highway 23 ½ mile south of Ovid. Water quantities are those at Julesburg gaging station 7 miles below.

St Vrain Creek

7 First bridge over creek below Lyons or if creek is dry here, from small canal crossing highway ½ mile below Lyons. Stream flow estimates by Code.

19 County highway bridge over creek about 1 mile above confluence with South Platte. Gaging station.

Big Thompson River

55 Dam at mouth of canon or near headgates of Handy Ditch. Stream flow data from gaging station at this point.

17 Bridge on State Highway 257 near Millikin above confluence with Little Thompson and waste water from Johnstown sugar factory. Estimates of stream flow by Code.

Cache la Poudre River

14 Dam at head of Jackson Ditch near Bellvue. Stream flow estimates by Code.

12 Dam at head of Lake Canal near Fort Collins. Stream flow estimates by Code.

13 Bridge on county road in NE ¼ Sec. 36 T. 6 N., R. 66 W. Near Greeley and above sewage contamination of city. Stream flow estimates by Code.

RESERVOIRS

57 Barr Lake, 3 miles southeast of Brighton. Samples taken at west outlet gates on face of dam. Filler canal heads in South Platte at Burlington Dam. Capacity 32,200 ac. ft.

59 Milton Reservoir, 11 miles north of Hudson. Sample taken from face of dam on May 10, 1945, but from west shore May 1, 1944 and east shore Nov. 10, 1944. Fills through Barr Lake and picks up seepage water from Beebe Draw. Capacity 24,400 ac. ft.

75 Boyd Lake, 2 miles northeast of Loveland. Sample taken at outlet at south end. Filled from Big Thompson River in part through Louden Ditch which heads about 5 miles west of Loveland. Capacity 44,000 ac. ft.

72 Reservoir No. 6 of the North Poudre System, 2 miles southwest of Wellington. Fills from the North Poudre and at least in part through other higher reservoirs. Sample taken on dam face.

74 Terry Lake, 2 miles north of Ft. Collins. Fills from Poudre River from a point near Laporte. Samples taken from dam face at most southerly point. Cacpacity 8,200 ac. ft.

60 New Windsor Reservoir, 3 miles north of Windsor. Fills from the Cache la Poudre through the Larimer and Weld Canal (Eaton) which heads 2 miles west of Ft. Collins. Capacity 18,600 ac. ft.

69 Riverside Reservoir, 15 miles east of Kersey on north side of South Platte River. Fills from South Platte from point 4 miles east of Kersey. Samples taken from face of dam at outlet. Capacity 57,500 ac. ft.

62 Empire Reservoir, 20 miles east of Kersey on south side of South Platte River. Fills from South Platte at a point 6 miles east of Kersey. Sample taken from beach at point nearest U. S. Highway 6. Capacity 37,700 ac. ft.

66 Prewitt Reservoir, 4 miles south of Merino. Fills from South Platte from a point 4 miles northwest of Brush. Samples taken from face of dam. Capacity 32,800 ac. ft.

64 Julesburg Reservoir, 6 miles west of Sedgwick. Fills from South Platte at a point near Proctor. Samples taken from face of dam. Capacity 28,200 ac. ft.

## DRAINAGE WATER

79 A farm tile drain about ½ mile long on Byron Smith farm in NW ¼ Sec. 24 T. 3 N., R. 70 W. Samples taken at outlet.

16 Latham Drain 1 mile west of LaSalle. An open drain about 3 miles long. Samples taken at ditch crossing 600 feet above county road bridge near outlet.

## WELLS

### Arapahoe County

2 Irrigation well 32 feet deep, 48-in. diameter concrete casing. Depth to water 4 feet. On river bottom land 0.1 mile west of bridge over South Platte at west edge of Littleton. Owner T. A. Koldeway. Samples taken by lowering sampler in idle well.

56 Domestic well 21 feet deep. Depth to water 8 feet. On main street south of railroad, last house of 3 west of a corner west of business district of Byers. Owner R. C. Floreth. Samples taken from outside faucet.

Adams County

4 Domestic well 32 feet deep, 4-inch metal casing. Depth to water about 28 feet. Well is in basement of dwelling owned by R. E. Murfine, one block east, 2 blocks north of school and is first house north of a brick house in Adams City. Land description NW ¼, NE ¼, Sec. 6 T. 3 S., R. 67 W. Samples taken from yard hydrant.

5 Brighton, City supply. Wells 38 feet deep, 12 feet diameter, 22 feet to water. Samples taken from outside hydrant at water works and are a composite of 3 wells.

22 Irrigation well near center of Sec. 35 T. 2 S., R. 65 W. west one of two. Depth about 50 feet, metal casing 48 inches in diameter. Depth to water 16 feet. Sample taken from discharge pipe once and at other times by means of sampler in idle well.

37 Irrigation well 85 feet deep. Depth to water 30 feet. East one of two in SW ¼ Sec. 29 T. 1 S., R. 60 W. Owner J. D. Singleton. Samples taken by starting pump.

Boulder County

78 Stock well 60 feet deep, 6-in. metal casing. Depth to water 8 feet. In garage of owner Byron Smith in SW corner NW ¼ Sec. 24 T. 3 N. R. 70 W. Sample taken direct from pump.

Larimer County

54 Irrigation well 24 feet deep, 48-inch metal casing. Depth to water 7 feet. In NE ¼ Sec. 17 T. 5 N., R. 68 W. and is the north one of 2 such wells. Owner George Peak. Samples taken with sampler from idle well.

53 Domestic well 12 feet deep, 15-in. metal casing. In front of log house east side of road and 0.2 mi. south of U.P.R.R., ½ mile south of LaPorte, Owner E. S. Devore. Samples taken directly from hand pump.

50 Irrigation well 17 feet deep, brick curb 8 feet in diameter. Depth to water 5 feet. On south side of State Highway 14 (old concrete) 0.3 mi. east of Andersonville road in SW ¼ Sec. 7 T. 7 N., R. 68 W. Owner Adam S. Schneider. Samples taken with sampler from idle well.

11 Wellington public water supply. Source is from metal cased wells on north side of town 52 feet deep. Depth to water 20 feet. Samples taken from faucet in a garage on main street.

73 Stock well. Dug well 36 feet deep, 28 feet to water. Among outbuildings back of dwelling in SE ¼ NE¼ Sec. 2 T. 8 N., R. 68 W. Owner G. Wich. Well is on high ground with large seep area ¼ mi. north. Samples taken from hand pump.

Weld County

9 Municipal supply town of Nunn. Well is about 35 feet deep and metal cased. Samples taken from faucet in garage.

8 Municipal supply of town of Pierce. Well is 35 feet deep and metal cased. Samples taken from an outdoor yard hydrant.

24 Domestic well at Olive Branch School, District 62 in NE ¼ Sec. 28 T. 8 N., R. 65 W. Well is of unknown depth but not greater than 40 feet and is metal cased. Samples taken directly from hand pump.

25 Municipal supply of town of Ault. Supply is from 2 wells one in town at tank and other ½ mile west of town. Samples are from well in town which is 38 feet deep and has concrete block curb 11 feet in diameter. Samples taken at pump house in such a manner as to avoid composite sample.

61 Irrigation well 17 feet deep, 36 inch metal casing. Depth to water 9 feet. In SE ¼ Sec. 17 T. 6 N., R. 67 W. Owner Henry Kraus. Samples taken with sampler from idle well.

33 Stockwell, feet deep, 6 inch casing. Depth to water about 15 feet. Among outbuildings at first house west of Farmer's Spur on North side of R. R. in SW ¼ 28 T. 6 N., R. 66 W. Owner Mrs. Rika Anderson. Samples taken direct from pump.

32 Domestic well 40 feet deep, metal casing. Depth to water 25 feet. In NW ¼ Sec. 17 T. G N., R 65 W. Owner Harry Farr. Samples taken from faucet under tank.

31 Stock well 28 feet deep, metal casing. Depth to water 13 feet. Adjacent to feeding corral east of dwelling in. NW ¼ Sec. 34 T. 6 N., R. 65 W. Owner Ildo Williams. Samples taken from hydrant.

27 Domestic well 50 feet deep, 6-inch metal casing. Depth to water 10 feet. Adjacent to dwelling 1/8 mile south of Barnesville School. Owner Mrs. Grace Baker. In SE, SE Sec. 18 T. 6 N., R. 63 W. Samples taken directly from hand pump.

18 Domestic well 15 feet deep metal cased. In milk house 0.4 mi. west of Daniels School and 1.1 miles east of water tower at Millikin on north side of highway. Owner Wm Wambolt. Samples taken from trough used to cool milk.

30 Municipal water supply of LaSalle. Two wells 30 feet apart 65 to 70 feet deep, lower 15 feet only, perforated. Depth to water 12 feet. Samples taken from hydrant at filling station on U. S. Highway 85.

71 Municipal water supply of Kersey. Well probably 70 feet deep. Depth to water 27 feet. Samples taken from taps in stores.

52 Stock well 60 feet deep 6 inch metal casing. Depth to water 20 feet. First house on west side country road north from U. S. Highway 6 in SE ¼ Sec. 25 T 5 N., R. 64 W. Mutual Savings & Life Ins. Co. owner. Samples taken directly from pump.

70 Domestic well 70 feet deep, metal cased. Depth to water estimated 10 feet. On south side country road in NE corner NW¼ Sec. 4 T. 4 N., R. 63 W. Owner R. C. Croissant. Samples taken from pump in milk house.

34 Domestic well 26 feet deep, 6-inch casing. Considered very poor, unhealthful water by tennant. Well is inside porch of house on edge of terrace about ½ mile south of bridge on county road, west side of road in SW ¼, Sec. 3 T. 3 N., R. 67 W. Owner Arthur Steyaert. Samples direct from pump but last 3 samples taken when house was vacant and well not in use.

21 Irrigation well, 65 feet deep, 48-inch metan casing. Depth to water 16 feet. Well is about 300 feet southwest of dwelling in SE ¼ Sec 31 T. 4 n., R. 66 W. Owner Farr Farms Co. Samples taken with sampler from idle well.

82 Irrigation well 63 feet deep 24-in. metal casing. Depth to water 16 feet. In SW ¼ SE ¼ Sec. 12 T 1 N., R. 65 W. Owner John Bernhardt. Sample taken direct from pump.

83 Irrigation well 171 feet deep, metal cased. Depth to water 92 feet. North one of 2 wells about 600 feet apart. In NW ¼ SE ¼ Sec. 27, T. 1 N., R. 63 W. Owner Wm C. Vogt. Sample taken direct from pump.

35 Domestic well 86 feet deep, 6-in. casing. Depth to water 62 feet. At tavern and cafe about 150 feet west of corner in SE ¼ Sec. 3 T. 1 N., R. 63 W. Taken from tap inside of tavern.

84 Irrigation well 84 feet deep, metal cased. Depth to water 20 feet. In NE ¼ Sec. 22 T. 2 N., R. 63 W. Owner John Zimbleman. Sample taken from pump discharge.

58 Domestic well 80 feet deep, 6-in. casing. Depth to water, 6 feet. Casing perforated bottom 7 feet only which probably taps a different quality than exists in upper strata. Well is at a dwelling at northwest corner of street intersection, 1 block east of school house at Roggen. Owner Wm Cooper.

77 Irrigation well 35 feet deep, 48-in. concrete rings. Depth to water 28 feet. North one of 4 in battery of wells in SW ¼ SW ¼ Sec. 6 T. 2 N., R. 68 W. Owner K. Mayeda. Samples taken with sampler from idle well.

76 Stock well 30 feet deep. Depth to water, 4 feet. In bottom land of St. Vrain Cr. Water is pumped ¼ mile west to dwelling and corrals. In NW ¼ Sec 16 T. 3 N., R.67 W. Roy L. Goodwin, owner. Samples from hydrant at dwelling.

Morgan County

39 Domestic well 114 feet deep, 5-in. casing. Depth to water 53 feet. Casing perforated bottom 24 feet only. Well is located in dooryard of farmstead in SW corner Sec. 22 T. 3 N., R. 60 W. Owner B. A. Holden. Kiowa drainage. Sample taken directly from pump.

38 Domestic well, 58 feet deep, metal casing. Depth to water about 46 feet. Well is in outbuilding of farmstead in SW corner Sec. 7, T. 2 N., R. 59 W. Owner J. W. Maddox. Samples taken direct from pump or from barrel containing freshly pumped water.

81 Domestic well 160 feet deep, metal cased. Depth to water about 50 feet. Well is west of dwelling in NE corner SE ¼ Sec. 24 T. 3 N., R. 60 W. Owners Doctors Widney and Ringle of Greeley. Samples taken from tap in dwelling.

46 Domestic well 120 feet deep, 6-in. metal casing. Depth to water 43 feet. Casing perforated from 110 to 120 feet. Quality varies among the various strata. Well is on city lot at 115 West Street, Ft. Morgan. Owner L. L. Canfield. Samples taken from yard hydrant.

67 Irrigation well 70 feet deep, 48-in. steel casing. Depth to water 33 feet. In SW ¼ SE ¼ Sec. 1 T. 1 N., R. 56 W. Owner Mrs. John Shaw. Samples taken with sampler from idle well.

28 Stock well 35 feet deep, 6-in. metal casing. Depth to water 19 feet. In shed 300 feet east of dwelling in SE Cor SW ¼ Sec. 23 T. 4 N., R. 56 W. Owner Hansen Bros. Samples taken direct from pump.

Logan County

51 Domestic well 18 feet deep, 5-in. metal casing. Depth to water 11 feet. In basement of dwelling on north (west) side of U. S. Highway 6 ¼ mile S. W. of Merino. Owner J. W. County. Samples taken from tap inside dwelling.

80 Domestic well. Dug about 20 feet deep. Depth to water about 10 feet. In dooryard on west bank of Pawnee Creek In NW ¼ Sec. 24 T. 7 N., R. 53 W. Owner Mary Conti. Samples taken from pump driven by windmill.

40 Municipal supply, town of Iliff. Well is 80 feet deep. Depth to water 15 feet. Casing perforated full length. Samples taken from tap in store.

65 Domestic well. Sand point driven to 35 feet. Depth to water less than 10 feet. Located in dooryard of dwelling 400-500 feet north of Griff beet dump in NW corner Sec. 6 T. 9 N., R. 50W. Owner J. K. Crum. Samples taken from yard hydrant.

47 Municipal supply, town of Crook. Well 51 feet deep, 18-in. metal casing. Depth to water estimated 10 feet. Bottom 22 feet perforated. Samples taken from tap in garage.

Sedgwick County

63 Domestic well. Drilled, shallow depth. At 1½ story stucco house on north side of county road 0.8 mile west of Sedgwick School, in SE ¼ Sec. 12 T. 11 N., R. 47 W. Owner Mrs. Anna Jenig. Samples direct from hand pump.

44 Reserve, little-used well in power house, town of Julesburg. Depth 28 feet, 24-in casing, depth to water 10 feet. Samples taken either by starting pump, or with sampler from idle well.

Table of Water Quality Data in Parts per Million
Compiled by Drainages in Down-Stream Order

| Sample No. | Date | Stream Flow c.f.s. | Reservoir Contents ac.-ft. | Well Depth to Water ft. | Well Depth of Well ft. | pH | Total Solids p.p.m. | Vol. Solids p.p.m. | Organic | $CO_3$ ppm | Cl ppm | $NO_3$ ppm | $SiO_2$ ppm | $SO_4$ ppm | Ca ppm | Mg ppm | Na ppm | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | STREAMS | | | | | | | | | | |
| South Platte at Watertown | | | | | | | | | | | | | | | | | | |
| 26 | 4-4-44 | 12 | | | | 7.3 | 141 | 12 | tr. | 30 | 20 | 0 | 15 | 20 | 21 | 7 | 13 | |
| | 11-3-44 | 14 | | | | 7.3 | 257 | 25 | lt. tr. | 48 | 52 | 0 | 9 | 54 | 34 | 14 | 32 | |
| | 4-13-45 | 23 | | | | 7.5 | 173 | 19 | lt. | 35 | 32 | 0 | 9 | 29 | 26 | 8 | 19 | |
| South Platte at Littleton | | | | | | | | | | | | | | | | | | |
| 1 | 11-5-43 | 19 | | | | 7.7 | 341 | 36 | tr. | 83 | 30 | 0 | 17 | 78 | 54 | 15 | 36 | |
| | 4-4-44 | 72 | | | | 7.7 | 298 | 17 | tr. | 60 | 23 | 0 | 33 | 68 | 46 | 12 | 27 | |
| | 11-3-44 | 10 | | | | 7.5 | 375 | 25 | sl. | 95 | 36 | 0 | 16 | 106 | 54 | 18 | 41 | |
| | 4-13-45 | 20E | | | | 7.7 | 274 | 22 | lt. | 72 | 32 | 0 | 15 | 61 | 46 | 11 | 27 | |
| South Platte at north city limit Denver | | | | | | | | | | | | | | | | | | |
| 3 | 11-5-43 | 120 | | | | 6.9 | 665 | 83 | odor. | 168 | 127 | 0 | 15 | 138 | 61 | 16 | 120 | |
| | 4-24-44 | 322 | | | | 6.8 | 392 | 27 | lt. | 95 | 46 | 0 | 21 | 74 | 87 | 11 | 44 | |
| | 11-3-44 | 68 | | | | 7.1 | 667 | 44 | mod. | 145 | 160 | 0 | 19 | 137 | 63 | 17 | 47 | |
| | 5-4-45 | 238 | | | | 7.1 | 443 | 48 | heavy | 132 | 78 | 32 | 14 | 97 | 57 | 11 | 55 | |
| South Platte at Brighton | | | | | | | | | | | | | | | | | | |
| 6 | 11-5-43 | 100E | | | | 7.7 | 635 | 55 | odor. | 143 | 82 | tr. | 15 | 174 | 78 | 18 | 94 | |
| | 4-24-44 | 320E | | | | 6.9 | 529 | 30 | lt. | 85 | 42 | 10 | 10 | 182 | 73 | 17 | 45 | |
| | 11-3-44 | 100E | | | | 7.5 | 667 | 50 | sl. | 132 | 80 | 0 | 16 | 193 | 84 | 20 | 22 | |
| | 1-26-45 | 100 | | | | 7.5 ~~7.7~~ | 731 | 87 | | | | 3 | | | | | | |
| | 3-13-45 | 65 | | | | 7.7 | 743 | 125 | | | | 8.12 | | | | | | |
| | 5-4-45 | 100E | | | | 7.3 | 505 | 46 | mod. | 108 | 58 | 4 | 12 | 148 | 66 | 14 | 55 | |
| | 6-1-45 | 120 | | | | 6.8 | 258 | 51 | | | | | | | | | | |
| South Platte below Platteville | | | | | | | | | | | | | | | | | | |
| 20 | 11-15-43 | 75E | | | | 8.1 | 765 | 48 | lt. | 155 | 70 | tr. | 16 | 247 | 99 | 27 | 104 | |
| | 4-24-44 | 375E | | | | 7.3 | 709 | 44 | tr. | 95 | 70 | 4 | 10 | 251 | 84 | 24 | 105 | |
| | 11-7-44 | 150E | | | | 7.5 | 754 | 40 | sl. | 145 | 72 | 4 | 22 | 246 | 101 | 26 | 87 | |
| | 5-5-45 | 100E | | | | 7.9 | 714 | 55 | mod. | 120 | 76 | 4 | 12 | 248 | 90 | 24 | 104 | |
| South Platte below Evans | | | | | | | | | | | | | | | | | | |
| 15 | 11-15-43 | 200E | | | | 7.7 | 1306 | 109 | mod. | 192 | 52 | 0 | 22 | 542 | 142 | 70 | 145 | |
| | 4-28-44 | 1000E | | | | 7.7 | 770 | 77 | lt. | 85 | 28 | 0 | 15 | 348 | 76 | 41 | 10 | |
| | 10-23-44 | 100E | | | | 7.9 | 1475 | 140 | mod. | 155 | 52 | tr. | 17 | 728 | 153 | 81 | 150 | |
| | 4-30-45 | 400E | | | | 7.9 | 1049 | 148 | lt. | 120 | 46 | 2 | 11 | 505 | 105 | 62 | 106 | |

| Sample | Date | Stream Flow c.f.s. | Reservoir Contents ac.-ft. | Well: Depth to Water | Well: Depth of Well | pH | Total Solids p.p.m. | Vol. Solids p.p.m. | Organic | $CO_3$ ppm | Cl ppm | $NO_3$ ppm | $SiO_2$ ppm | $SO_4$ ppm | Ca ppm | Mg ppm | Na ppm | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South Platte at Kersey | | | | | | | | | | | | | | | | | | |
| 10 | 11-12-43 | 313 | | | | 7.6 | 1207 | 145 | odor. | 198 | 48 | 0 | 15 | 598 | 163 | 72 | 146 | |
| | 5-5-44 | 2490 | | | | 7.4 | 605 | 53 | sl. | 72 | 26 | 0 | 17 | 265 | 73 | 29 | 70 | |
| | 10-26-44 | 209 | | | | 7.9 | 1461 | 140 | mod. | 168 | 54 | 0 | 19 | 700 | 151 | 78 | 135 | |
| | 1-26-45 | ~~100~~ 506 | | | | 7.7 | 1258 | 161 | | | | 4 | | | | | | |
| | 4-30-45 | 496 | | | | 7.8 | 1212 | 159 | mod. | 120 | 48 | 2 | 10 | 593 | 127 | 69 | 125 | |
| | 3-13-45 | 391 | | | | 7.9 | 1374 | 198 | | | | 8 | | | | | | |
| | 6-1-45 | 982 | | | | 7.8 | 1120 | 185 | | | | | | | | | | |
| South Platte above Orchard | | | | | | | | | | | | | | | | | | |
| 43 | 11-20-43 | 80 | | | | 8.1 | 1301 | 113 | tr. | 168 | 48 | 0 | 31 | 394 | 159 | 58 | 128 | |
| | 5-5-44 | 2980 | | | | 7.4 | 682 | 63 | sl. | 72 | 28 | 0 | 20 | 307 | 77 | 32 | 76 | |
| | 10-23-44 | 142 | | | | 8.0 | 1194 | 92 | mod. | 145 | 52 | 0 | 15 | 623 | 118 | 62 | 114 | |
| | 1-26-45 | 78 | | | | 7.9 | 1252 | 137 | | | | 2 | | | | | | |
| | 3-13-45 | 81 | | | | 8.0 | 1270 | 183 | | | | 4 | | | | | | |
| | 4-30-45 | 178 | | | | 7.9 | 1293 | 133 | lt. | 145 | 52 | 0 | 14 | 613 | 154 | 55 | 97 | |
| | 6-1-45 | 408 | | | | 7.7 | 1155 | 191 | | | | | | | | | | |
| South Platte at Ft. Morgan | | | | | | | | | | | | | | | | | | |
| 42 | 11-20-43 | 142 | | | | 8.0 | 1291 | 112 | mod. | 143 | 50 | 0 | 25 | 325 | 160 | 54 | 134 | |
| | 5-2-44 | 1790 | | | | 7.5 | 770 | 82 | tr. | 95 | 32 | 0 | 13 | 351 | 93 | 37 | 82 | |
| | 10-23-44 | 150 | | | | 8.1 | 1235 | 108 | mod. | 120 | 50 | 0 | 18 | 620 | 134 | 56 | 118 | |
| | 5-2-45 | 330 | | | | 7.9 | 1291 | 112 | sl. | 120 | 52 | 0 | 18 | 622 | 158 | 52 | 108 | |
| South Platte above Merino | | | | | | | | | | | | | | | | | | |
| 23 | 11-19-43 | 30E | | | | ~~8.6~~ 8.2 | 1476 | 132 | tr. | 150 | 54 | tr. | 19 | 567 | 188 | 62 | 140 | |
| | 5-2-44 | 1600E | | | | 7.7 | 897 | 74 | tr. | 95 | 34 | 0 | 17 | 422 | 113 | 42 | 93 | |
| | 10-25-44 | 10E | | | | 8.1 | 1322 | 104 | mod. | 108 | 54 | 0 | 23 | 679 | 166 | 58 | 106 | |
| | 5-1-45 | 40E | | | | 7.9 | 1437 | 144 | mod. | 132 | 58 | 6 | 21 | 694 | 186 | 56 | 114 | |
| South Platte at Sterling | | | | | | | | | | | | | | | | | | |
| 49 | 11-20-43 | 50E | | | | 8.1 | 1303 | 103 | tr. | 132 | 48 | 0 | 29 | 382 | 166 | 55 | 123 | |
| | 5-3-44 | 1600E | | | | 7.7 | 949 | 86 | sl. | 85 | 38 | 0 | 20 | 439 | 119 | 43 | 100 | |
| | 10-25-44 | 50E | | | | 8.0 | 1182 | 91 | lt. | 120 | 48 | tr. | 36 | 584 | 136 | 49 | 113 | |
| | 5-2-45 | 100E | | | | 8.0 | 1339 | 123 | lt. | 120 | 56 | tr. | 24 | 657 | 166 | 48 | 111 | |
| South Platte at Crook | | | | | | | | | | | | | | | | | | |
| 48 | 11-20-43 | 60E | | | | 8.1 | 1420 | 87 | tr. | 143 | 66 | 0 | 41 | 407 | 151 | 52 | 141 | |
| | 5-3-44 | 1600E | | | | 7.7 | 1089 | 90 | sl. | 108 | 44 | 4 | 21 | 517 | 133 | 46 | 121 | |
| | 10-25-44 | 60E | | | | 8.1 | 1364 | 90 | m. hy. | 120 | 72 | 0 | 35 | 704 | 146 | 48 | 120 | |
| | 5-2-45 | 125E | | | | 8.1 | 1594 | 133 | mod. | 132 | 80 | 0 | 24 | 790 | 192 | 55 | 134 | |

| Sample | Date | Stream Flow c.f.s. | Reservoir Contents ac.-ft. | Depth to Water | Depth of Well | pH | Total Solids p.p.m. | Vol. Solids p.p.m. | Organic | $CO_3$ ppm | Cl ppm | $NO_3$ ppm | $SiO_2$ ppm | $SO_4$ ppm | Ca ppm | Mg ppm | Na ppm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| South Platte at Ovid | | | | | | | | | | | | | | | | | |
| 36 | 11-20-43 | 100 | | | | 8.1 | 1282 | 105 | sl. | 132 | 62 | tr. | 24 | 537 | 177 | 46 | 140 |
| | 5-3-44 | 1600 | | | | 7.9 | 1213 | 98 | tr. | 108 | 48 | 0 | 24 | 565 | 151 | 51 | 137 |
| | 10-25-44 | 107 | | | | 8.0 | 1298 | 104 | lt. | 108 | 74 | tr. | 31 | 636 | 178 | 45 | 104 |
| | 5-2-45 | 187 | | | | 8.1 | 1474 | 141 | mod. | 120 | 70 | 0 | 23 | 736 | 174 | 51 | 108 |
| St. Vrain at Lyons | | | | | | | | | | | | | | | | | |
| 7 | 11-15-43 | 5 | | | | 7.1 | 53 | 13 | tr. | 25 | 2 | tr. | 9 | 5 | 7 | tr. | 3 |
| | 5-16-44 | 232 | | | | 6.3 | 52 | 18 | lt. | 12 | 4 | 0 | 13 | 13 | 5 | 2 | 3 |
| | 11-1-44 | 10 | | | | 6.7 | 146 | 30 | | 48 | 10 | tr. | 9 | 30 | 26 | 8 | 5 |
| | 6-1-45 | 392 | | | | 6.7 | 39 | 15 | lt. | 12 | 4 | 0 | 7 | 1 | 2 | 2 | 5 |
| St. Vrain at mouth | | | | | | | | | | | | | | | | | |
| 19 | 11-15-43 | 79 | | | | 7.5 | 1580 | 197 | hy. tr. | 275 | 38 | 0 | 17 | 529 | 144 | 92 | 159 |
| | 4-24-44 | 531 | | | | 7.9 | 835 | 101 | lt. | 95 | 18 | 0 | 14 | 395 | 77 | 53 | 88 |
| | 11-7-44 | 66 | | | | 7.3 | 1493 | 127 | m. hy. | 288 | 32 | 0 | 4 | 563 | 138 | 88 | 168 |
| | 5-5-45 | 223 | | | | 7.6 | 601 | 78 | mod. | 85 | 34 | 1 | 14 | 280 | 60 | 36 | 65 |
| Big Thompson near mouth of canon | | | | | | | | | | | | | | | | | |
| 55 | 11-26-43 | 25 | | | | 6.7 | 40 | 11 | mod. | 12 | 2 | 0 | 7 | 0 | 6 | 3 | 4 |
| | 5-16-44 | 825 | | | | 6.3 | 55 | 21 | sl. | 7 | 5 | 0 | 8 | 14 | 4 | 2 | 3 |
| | 11-7-44 | 28 | | | | 6.9 | 56 | 7 | sl. | 12 | 6 | 0 | 15 | 10 | 9 | 1 | 4 |
| | 5-10-45 | ~~800~~ 300 | | | | 6.8 | 46 | 19 | lt. | 25 | 8 | 0 | 9 | 16 | 19 | 1 | 2 |
| Big Thompson near Milliken | | | | | | | | | | | | | | | | | |
| 17 | 11-15-43 | 10E | | | | 7.7 | 2643 | 392 | hy. tr. | 288 | 38 | 0 | 17 | 821 | 258 | 88 | 221 |
| | 4-24-44 | 20E | | | | 8.1 | 2527 | 287 | tr. | 168 | 36 | 0 | 14 | 1328 | 168 | 199 | 222 |
| | 11-10-44 | 10E | | | | 7.1 | 1972 | 163 | m. hy. | 300 | 32 | 0 | 21 | 706 | 257 | 115 | 130 |
| | 5-10-45 | 20E | | | | 7.7 | 2372 | 339 | mod. | 155 | 70 | 0 | 9 | 1249 | 236 | 164 | 210 |
| Cache la Poudre at Bellvue | | | | | | | | | | | | | | | | | |
| 14 | 11-13-43 | 44 | | | | 7.6 | 128 | 15 | tr. | 55 | 6 | 0 | 7 | 11 | 26 | 7 | 8 |
| | 5-16-45 | 602 | | | | 6.8 | 85 | 24 | lt. | 18 | 4 | 0 | 18 | 14 | 12 | 3 | 4 |
| | 12-1-44 | 30 | | | | 7.7 | 160 | 15 | tr. | 48 | 8 | 0 | 10 | 26 | 29 | 8 | 8 |
| | 5-18-45 | 558 | | | | 6.9 | 64 | 20 | lt. | 25 | 8 | 0 | 8 | 22 | 19 | 1 | 4 |
| Cache la Poudre at Ft. Collins | | | | | | | | | | | | | | | | | |
| 12 | 11-13-43 | 4E | | | | 7.9 | 575 | 57 | tr. | 132 | 10 | 0 | 10 | 209 | 99 | 31 | 37 |
| | 12-1-44 | 6E | | | | 7.9 | 534 | 47 | tr. | 108 | 14 | tr. | 11 | 192 | 89 | 28 | 32 |
| | 5-18-45 | 50E | | | | 7.0 | 105 | 25 | m. hy. | 35 | 10 | 0 | 10 | 29 | 28 | 2 | 6 |

| Sample | Date | Stream Flow c.f.s. | Reservoir Contents ac.ft. | Depth to Water | Depth of Well | pH | Total Solids p.p.m. | Vol. Solids p.p.m. | Organic | $CO_3$ ppm | Cl ppm | $NO_3$ ppm | $SiO_2$ ppm | $SO_4$ ppm | Ca ppm | Mg ppm | Na ppm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cache la Poudre above Greeley | | | | | | | | | | | | | | | | | |
| 13 | 11-15-43 | 10est. | | | | 8.0 | 2373 | 268 | sl. | 186 | 48 | tr. | 21 | 1197 | 237 | 154 | 206 |
| | 5-1-44 | 50est. | | | | 7.9 | 2171 | 174 | tr. | 145 | 24 | 4 | 13 | 1134 | 216 | 145 | 371 |
| | 10-23-44 | 15est. | | | | 8.0 | 2381 | 270 | lt. | 180 | 52 | 8 | 17 | 1255 | 237 | 156 | 10 — ? |
| | 4-30-45 | 30est. | | | | 8.0 | 2278 | 293 | mod. | 155 | 58 | 4 | 11 | 1170 | 221 | 153 | 228 |
| Latham Drain near LaSalle | | | | | | | | | | | | | | | | | |
| 16 | 11-15-43 | 16E | | | | 8.3 | 792 | 68 | tr. | 150 | 56 | 24 | 17 | 259 | 106 | 34 | 94 |
| | 4-28-44 | 16E | | | | 8.1 | 797 | 62 | tr. | 120 | 64 | 20 | 20 | 254 | 90 | 42 | 33 |
| | 11-10-44 | 18E | | | | 8.0 | 763 | 65 | tr. | 145 | 60 | 24 | 24 | 271 | 93 | 35 | 85 |
| | 5-10-45 | 18E | | | | 7.9 | 746 | 88 | sl. | 132 | 72 | 20 | 15 | 259 | 108 | 28 | 65 |
| RESERVOIRS | | | | | | | | | | | | | | | | | |
| Barr Lake near Brighton - Adams County | | | | | | | | | | | | | | | | | |
| 57 | 4-24-44 | | 28,700 | | | 8.3 | 497 | 37 | sl. | 108 | 68 | 0 | 10 | 120 | 59 | 14 | 12 |
| | 11-3-44 | | 2,200 | | | 7.3 | 451 | 57 | mod. | 85 | 66 | 0 | 1 | 134 | 49 | 14 | 71 |
| | 5-4-44 | | 25,500 | | | 7.8 | 517 | 49 | m. hy. | 120 | 74 | 32 | 19 | 128 | 69 | 14 | 50 |
| Milton Reservoir near Platteville - Weld County | | | | | | | | | | | | | | | | | |
| 59 | 5-1-44 | | 17,700 | | | 8.1 | 1313 | 116 | lt. | 132 | 120 | 0 | 40 | 558 | 133 | 49 | 103 |
| | 11-10-44 | | 4,450 | | | 7.9 | 934 | 49 | mod. | 85 | 100 | 0 | 17 | 410 | 64 | 39 | 140 |
| | 5-10-45 | | 10,400 | | | 7.3 | 949 | 69 | m. hy. | 95 | 100 | 0 | 13 | 413 | 66 | 40 | 117 |
| Riverside Reservoir near Masters - Weld County | | | | | | | | | | | | | | | | | |
| 69 | 5-5-44 | | 56,000 | | | 7.7 | 1167 | 118 | lt. | 108 | 48 | 4 | 22 | 546 | 114 | 65 | 133 |
| | 4-30-45 | | 53,700 | | | 7.9 | 1237 | 155 | mod. | 132 | 62 | tr. | 8 | 593 | 119 | 64 | 134 |
| Empire Reservoir near Wiggins - Weld County | | | | | | | | | | | | | | | | | |
| 62 | 5-1-44 | | 34,100 | | | 7.7 | 1147 | 111 | lt. | 108 | 46 | 4 | 7 | 549 | 107 | 63 | 136 |
| | 10-23-44 | | 2,400 | | | 7.1 | 1367 | 132 | m. hy. | 48 | 68 | 0 | 11 | 757 | 93 | 73 | 173 |
| | 4-30-45 | | 33,800 | | | 7.7 | 1230 | 145 | mod. | 108 | 54 | 4 | 13 | 605 | 111 | 68 | 136 |
| Prewitt Reservoir near Merino - Washington County | | | | | | | | | | | | | | | | | |
| 66 | 5-4-44 | | 30,000 | | | 8.0 | 1241 | 126 | lt. | 108 | 48 | 0 | 16 | 624 | 144 | 57 | 136 |
| | 10-25-44 | | 2,500 | | | 7.3 | 1538 | 162 | m. hy. | 60 | 64 | 0 | 7 | 835 | 148 | 74 | 125 |
| | 5-1-45 | | 26,400 | | | 7.8 | 1311 | 157 | mod. | 95 | 58 | 0 | 14 | 664 | 154 | 57 | 132 |
| Julesburg Reservoir near Sedgwick - Sedgwick County | | | | | | | | | | | | | | | | | |
| 64 | 5-3-44 | | 22,100 | | | 7.6 | 1439 | 115 | lt. | 95 | 66 | 0 | 26 ~~30~~ | 724 | 158 | 57 | 174 |
| | 10-25-44 | | 16,400 | | | 7.9 | 1565 | 111 | m. hy. | 108 | 72 | 0 | 25 | 814 | 237 | 62 | 124 |
| | 5-2-45 | | 22,800 | | | 7.9 | 1521 | 157 | mod. | 95 | 84 | 0 | 22 | 786 | 164 | 58 | 167 |

| Sample | Date | Stream Flow c.f.s. | Reservoir Contents ac. ft. | Well Depth to Water ft. | Well Depth of Well ft. | pH | Total Solids p.p.m. | Vol. Solids p.p.m. | Organic | $CO_3$ ppm | Cl ppm | $NO_3$ ppm | $SiO_2$ ppm | $SO_4$ ppm | Ca ppm | Mg ppm | Na ppm | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number 6 Reservoir near Wellington - Larimer County | | | | | | | | | | | | | | | | | | |
| 72 | 5-9-44 | | 7,500 | | | 8.1 | 1083 | 130 | lgt. | 95 | 18 | 0 | 9 | 553 | 103 | 72 | 99 | |
| | 11-6-44 | | 3,430 | | | 7.9 | 1553 | 182 | mod. | 72 | 26 | 0 | 14 | 822 | 126 | 102 | 142 | |
| | 5-18-45 | | 3,400 | | | 8.0 | 1745 | 241 | mod. | 108 | 58 | 0 | 12 | 951 | 144 | 117 | 123 | |
| Terry Lake near Ft. Collins - Larimer County | | | | | | | | | | | | | | | | | | |
| 74 | 5-16-44 | | 6,900 | | | 7.9 | 575 | 65 | sl. | 60 | 10 | 0 | 10 | 282 | 66 | 42 | 42 | |
| | 12-1-44 | | 850 | | | 7.9 | 1101 | 132 | sl. | 85 | 18 | 0 | 15 | 568 | 128 | 65 | 78 | |
| | 5-18-45 | | 4,900 | | | 7.9 | 621 | 75 | lgt. | 60 | 18 | 0 | 8 | 331 | 67 | 43 | 50 | |
| New Windsor Reservoir near Windsor - Weld County | | | | | | | | | | | | | | | | | | |
| 60 | 5-1-44 | | 14,600 | | | 7.9 | 1208 | 135 | lgt. | 95 | 22 | 0 | 6 | 638 | 134 | 78 | 96 | |
| | 10-23-44 | | 3,060 | | | 7.9 | 1142 | 135 | m. hy. | 72 | 22 | 0 | 15 | 612 | 113 | 77 | 88 | |
| | 4-30-45 | | 11,900 | | | 7.8 | 840 | 108 | mod. | 85 | 20 | 0 | 7 | 438 | 104 | 53 | 51 | |
| Boyd Lake near Loveland - Larimer County | | | | | | | | | | | | | | | | | | |
| 75 | 5-16-44 | | 30,000 | | | 7.9 | 519 | 52 | mod. | 65 | 13 | 0 | 11 | 234 | 62 | 31 | 50 | |
| | 11-7-44 | | 26,300 | | | 7.9 | 582 | 44 | mod. | 95 | 20 | 0 | 8 | 245 | 74 | 34 | 55 | |
| | 5-10-45 | | 25,700 | | | 8.0 | 596 | 63 | mod. | 95 | 42 | 0 | 5 | 270 | 67 | 37 | 56 | |
| WELLS | | | | | | | | | | | | | | | | | | |
| South Platte Drainage Direct - Arapahoe County | | | | | | | | | | | | | | | | | | |
| 2 | 11-5-43 | | | 4 | 32 | 7.1 | 455 | 47 | tr. | 125 | 36 | tr. | 24 | 108 | 67 | 15 | 62 | |
| | 4-4-44 | | | | | 7.0 | 692 | 38 | tr. | 132 | 41 | 4 | 21 | 223 | 106 | 26 | 62 | |
| | 11-3-44 | | | | | 7.0 | 568 | 36 | sl. | 132 | 48 | 8 | 20 | 162 | 87 | 21 | 48 | |
| | 4-13-45 | | | | | 7.3 | 685 | 42 | sl. | 145 | 48 | tr. | 19 | 216 | 109 | 24 | 76 | |
| Adams County | | | | | | | | | | | | | | | | | | |
| 4 | 11-5-43 | | | 28 | 32 | 7.9 | 1107 | 73 | tr. | 132 | 102 | 48 | 23 | 433 | 178 | 28 | 63 | |
| | 4-24-44 | | | | | 7.7 | 984 | 61 | tr. | 108 | 88 | 24 | 21 | 330 | 154 | 23 | 104 | |
| | 11-3-44 | | | | | 7.7 | 982 | 63 | sl. | 120 | 90 | 48 | 19 | 366 | 151 | 23 | 108 | |
| | 5-4-45 | | | | | 7.7 | 986 | 108 | sl. | 132 | 82 | 32 | 18 | 364 | 154 | 22 | 61 | |
| 5 | 11-5-43 | | | 22 | 38 | 7.9 | 999 | 66 | tr. | 180 | 91 | 32 | 22 | 332 | 138 | 37 | 134 | |
| | 4-24-44 | | | | | 7.3 | 978 | 69 | tr. | 180 | 90 | 20 | 20 | 287 | 134 | 36 | 122 | |
| | 11-3-44 | | | | | 7.3 | 901 | 62 | sl. | 155 | 90 | 32 | 25 | 301 | 109 | 34 | 112 | |
| | 5-4-45 | | | | | 7.4 | 955 | 108 | sl. | 155 | 92 | 28 | 20 | 299 | 135 | 33 | 68 | |
| Weld County | | | | | | | | | | | | | | | | | | |
| 21 | 11-15-43 | | | 11 | 65 | 7.7 | 571 | 53 | tr. | 150 | 58 | 48 | 22 | 164 | 78 | 21 | 56 | |
| | 4-24-44 | | | | | 7.5 | 560 | 41 | tr. | 95 | 50 | 32 | 21 | 138 | 77 | 20 | 59 | |
| | 11-10-44 | | | | | 7.3 | 617 | 62 | tr. | 120 | 58 | 32 | 25 | 182 | 86 | 25 | 69 | |
| | 5-5-45 | | | | | 7.5 | 623 | 55 | sl. | 108 | 54 | 28 | 17 | 180 | 87 | 25 | 69 | |

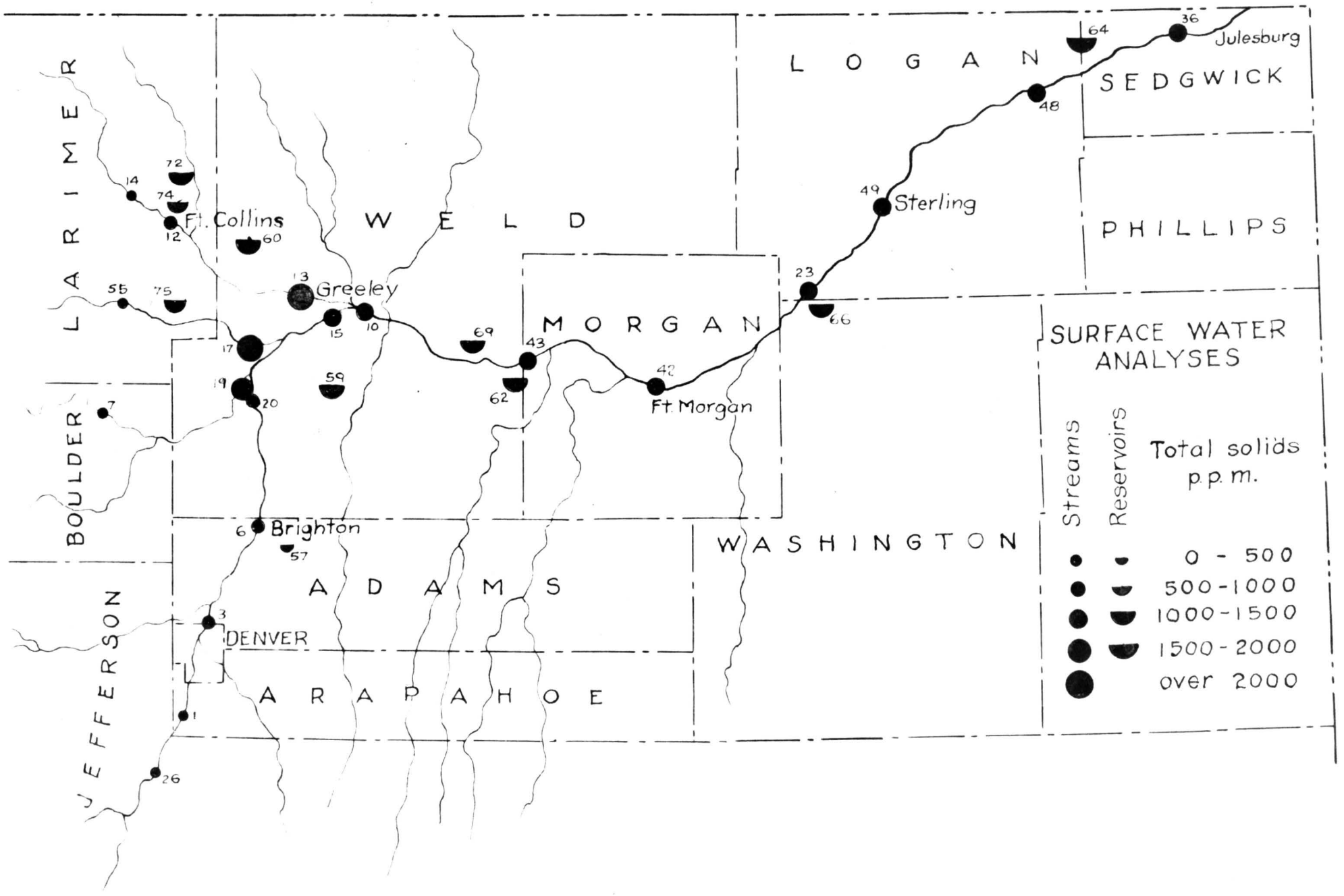
| Sample | Date | Stream Flow c.f.s. | Reservoir Contents ac. ft. | Well Depth to Water ft. | Well Depth of Well ft. | pH | Total Solids p.p.m. | Vol. Solids p.p.m. | Organic | $CO_3$ ppm | Cl ppm | $NO_3$ ppm | $SiO_2$ ppm | $SO_4$ ppm | Ca ppm | Mg ppm | Na ppm | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Weld County | | | | | | | | | | | | | | | | | | |
| 30 | 11-15-43 | | | 12 | 70 | 7.5 | 758 | 56 | tr. | 155 | 62 | 10 | 19 | 252 | 71 | 47 | 42 | |
| | 4-28-44 | | | | | 7.3 | 783 | 65 | tr. | 108 | 68 | 24 | 20 | 241 | 101 | 35 | 92 | |
| | 11-10-44 | | | | | 7.4 | 801 | 67 | tr. | 108 | 66 | 32 | 27 | 259 | 104 | 37 | 82 | |
| | 5-10-45 | | | | | 7.4 | 791 | 72 | tr. | 145 | 70 | 24 | 20 | 257 | 119 | 35 | 80 | |
| 71 | 5-5-44 | | | 27 | 70E | 7.1 | 1864 | 162 | sl. | 252 | 70 | 14 | 24 | 799 | 196 | 86 | 216 | |
| | 10-26-44 | | | | | 7.9 | 1732 | 130 | lgt. | 215 | 70 | 8 | 29 | 785 | 178 | 83 | 157 | |
| | 4-30-45 | | | | | 7.5 | 1887 | 244 | sl. | 180 | 84 | 20 | 26 | 863 | 199 | 86 | 218 | |
| 52 | 11-20-43 | | | 20 | 60 | 7.9 | 2221 | 185 | mod. | 228 | 98 | 0 | 26 | 960 | 300 | 241 | 239 | |
| | 5-1-44 | | | | | 7.9 | 2282 | 223 | lgt. | 215 | 102 | 0 | 19 | 1064 | 241 | 108 | 260 | |
| | 10-26-44 | | | | | 7.9 | 2378 | 253 | lgt. | 228 | 112 | 0 | 16 | 1152 | 301 | 100 | 264 | |
| | 4-30-45 | | | | | 7.5 | 2465 | 333 | hy. | 215 | 136 | 3 | 16 | 1178 | 319 | 98 | 204 | |
| 70 | 5-5-44 | | | 12 | 70 | 7.1 | 2048 | 154 | tr. | 205 | 90 | 16 | 28 | 909 | 244 | 84 | 204 | |
| | 10-23-44 | | | | | 7.9 | 1876 | 156 | sl. | 205 | 94 | 8 | 37 | 889 | 217 | 71 | 241 | |
| | 4-30-45 | | | | | 7.7 | 1840 | 196 | sl. | 215 | 82 | 16 | 29 | 824 | 234 | 63 | 226 | |
| Morgan County | | | | | | | | | | | | | | | | | | |
| 46 | 11-18-43 | | | 50 | 120 | 7.7 | 1560 | 137 | lgt. | 192 | 54 | 8 | 20 | 624 | 283 | 134 | 117 | |
| | 5-2-44 | | | | | 7.7 | 1498 | 96 | tr. | 155 | 56 | 4 | 28 | 672 | 286 | 50 | 84 | |
| | 10-23-44 | | | | | 7.9 | 1629 | 112 | lgt. | 180 | 68 | 6 | 27 | 774 | 302 | 51 | 108 | |
| | 4-30-45 | | | | | 7.9 | 1592 | 185 | sl. | 155 | 60 | 12 | 25 | 714 | 291 | 49 | 81 | |
| 28 | 11-19-43 | | | 20 | 35 | 7.2 | 1494 | 130 | sl. | 180 | 60 | 12 | 26 | 571 | 188 | 180 | 157 | |
| | 5-2-44 | | | | | 7.3 | 1767 | 176 | tr. | 145 | 62 | 4 | 27 | 833 | 196 | 87 | 174 | |
| | 10-24-44 | | | | | 7.9 | 1402 | 118 | mod. | 155 | 64 | 0 | 26 | 655 | 171 | 60 | 156 | |
| | 5-1-45 | | | | | 7.7 | 1734 | 247 | sl. | 192 | 68 | 4 | 24 | 776 | 226 | 71 | 178 | |
| Logan County | | | | | | | | | | | | | | | | | | |
| 51 | 11-20-43 | | | 11 | 18 | 7.5 | 1559 | 119 | lgt. | 168 | 60 | 12 | 31 | 595 | 200 | 183 | 168 | |
| | 5-4-44 | | | | | 8.0 | 1379 | 135 | tr. | 145 | 50 | 0 | 24 | 641 | 176 | 58 | 137 | |
| | 10-25-44 | | | | | 7.8 | 1847 | 205 | tr. | 145 | 78 | 12 | 30 | 893 | 228 | 78 | 158 | |
| | 5-1-45 | | | | | 7.9 | 1459 | 195 | lgt. | 132 | 58 | 3 | 22 | 690 | 180 | 59 | 154 | |
| 80 | 10-25-44 | | | 12E | 20 | 8.0 | 1464 | 112 | tr. | 145 | 60 | 18 | 47 | 685 | 217 | 55 | 129 | |
| | 5-1-45 | | | | | 7.7 | 1479 | 134 | sl. | 155 | 62 | 4 | 33 | 684 | 217 | 55 | 133 | |
| 40 | 11-20-43 | | | 15 | 80 | 7.9 | 3852 | 185 | mod. | 258 | 150 | 0 | 30 | 667? | 248 | 98 | 762 | |
| | 5-3-44 | | | | | 7.7 | 3926 | 223 | sl. | 228 | 154 | 0 | 33 | 2066 | 231 | 109 | 802 | |
| | 10-25-44 | | | | | 8.1 | 4122 | 227 | m. hy. | 240 | 190 | 0 | 29 | 2210 | 286 | 107 | 738 | |
| | 5-2-45 | | | | | 7.8 | 4223 | 273 | mod. | 265 | 270 | 0 | 32 | 2201 | 308 | 113 | 307 | |
| 65 | 5-3-44 | | | 8E | 35 | 7.7 | 2344 | 192 | mod. | 205 | 100 | 0 | 78 | 1092 | 229 | 83 | 330 | |
| | 10-25-44 | | | | | 8.0 | 1894 | 89 | mod. | 168 | 86 | 0 | 49 | 936 | 183 | 57 | 296 | |
| | 5-2-45 | | | | | 7.7 | 2235 | 200 | mod. | 180 | 94 | 1 | 52 | 1086 | 233 | 72 | 306 | |

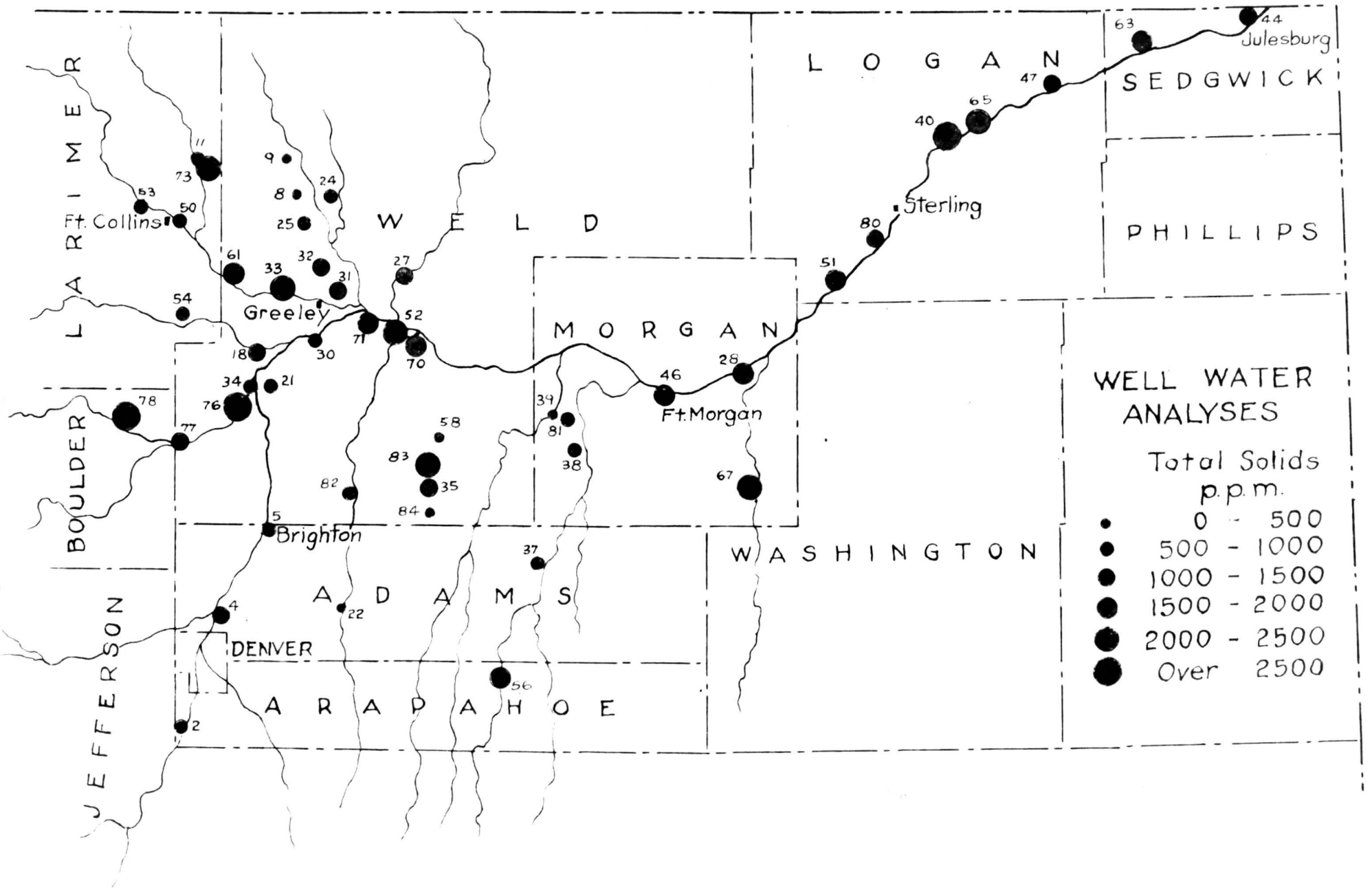
| Sample | Date | Stream Flow c.f.s. | Reservoir Contents ac. ft. | Well Depth to Water ft. | Well Depth of Well ft. | pH | Total Solids p.p.m. | Vol. Solids p.p.m. | Organic | $CO_3$ ppm | Cl ppm | $NO_3$ ppm | $SiO_2$ ppm | $SO_4$ ppm | Ca ppm | Mg ppm | Na ppm | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Logan County | | | | | | | | | | | | | | | | | | |
| 47 | 11-20-43 | | | 10E | 51 | 8.1 | 1449 | 94 | mod. | 155 | 94 | 0 | 36 | 607 | 208 | 114 | 163 | |
| | 5-3-44 | | | | | 7.9 | 1508 | 102 | lgt. | 155 | 100 | 0 | 33 | 659 | 213 | 42 | 174 | |
| | 10-25-44 | | | | | 8.1 | 1470 | 89 | mod. | 155 | 102 | 0 | 36 | 653 | 215 | 40 | 156 | |
| | 5-2-45 | | | | | 7.7 | 1507 | 129 | mod. | 155 | 106 | 0 | 34 | 669 | 214 | 39 | 169 | |
| Sedgwick County | | | | | | | | | | | | | | | | | | |
| 63 | 5-3-44 | | | | | 7.7 | 1961 | 189 | tr. | 132 | 114 | 40 | 50 | 890 | 213 | 77 | 177 | |
| | 10-25-44 | | | | | 7.9 | 1800 | 148 | sl. | 132 | 92 | 4 | 47 | 897 | 243 | 56 | 10 | ? |
| | 5-2-45 | | | | | 7.8 | 2025 | 216 | sl. | 168 | 116 | 24 | 47 | 941 | 275 | 63 | 207 | |
| 44 | 11-20-43 | | | 10 | 28 | 7.9 | 1339 | 85 | tr. | 155 | 68 | 24 | 50 | 583 | 187 | 103 | 134 | |
| | 5-2-44 | | | | | 7.6 | 1254 | 83 | tr. | 120 | 62 | 16 | 48 | 552 | 183 | 34 | 128 | |
| | 10-25-44 | | | | | 7.8 | 1312 | 79 | sl. | 132 | 84 | 12 | 52 | 593 | 195 | 37 | 122 | |
| | 5-2-45 | | | | | 7.7 | 1294 | 113 | sl. | 120 | 70 | 16 | 47 | 574 | 191 | 34 | 120 | |
| Cache la Poudre Larimer County | | | | | | | | | | | | | | | | | | |
| 53 | 11-24-43 | | | | 12 | 7.7 | 673 | 59 | sl. | 132 | 7 | 0 | 22 | 274 | 151 | 82 | 19 | |
| | 5-16-44 | | | | | 7.3 | 547 | 38 | tr. | 95 | 8 | 0 | 17 | 221 | 120 | 27 | 15 | |
| | 12-1-44 | | | | | 7.1 | 736 | 53 | sl. | 95 | 12 | 0 | 17 | 341 | 156 | 31 | 18 | |
| | 5-18-45 | | | | | 7.3 | 440 | 28 | lgt. | 120 | 16 | 0 | 10 | 152 | 99 | 19 | 10 | |
| 50 | 11-24-43 | | | 6 | 17 | 7.9 | 584 | 59 | sl. | 168 | 12 | 0 | 17 | 162 | 110 | 107 | 27 | |
| | 5-16-44 | | | | | 7.1 | 615 | 39 | tr. | 162 | 15 | 0 | 18 | 185 | 110 | 43 | 33 | |
| | 11-26-44 | | | | | 6.9 | 596 | 41 | sl. | 155 | 18 | 0 | 26 | 168 | 106 | 39 | 34 | |
| | 5-18-45 | | | | | 7.0 | 569 | 54 | lgt. | 168 | 16 | 0 | 20 | 186 | 110 | 37 | 35 | |
| Weld County | | | | | | | | | | | | | | | | | | |
| 61 | 5-1-44 | | | 7 | 16 | 7.9 | 1408 | 180 | tr. | 168 | 24 | 20 | 23 | 640 | 190 | 81 | 99 | |
| | 10-23-44 | | | | | 7.9 | 1564 | 172 | sl. | 132 | 34 | 16 | 23 | 812 | 196 | 91 | 107 | |
| | 4-30-45 | | | | | 7.4 | 1637 | 251 | sl. | 155 | 34 | 20 | 17 | 780 | 211 | 93 | 104 | |
| 33 | 11-15-43 | | | | | 7.9 | 2502 | 273 | tr. | 240 | 106 | 56 | 22 | 696 | 254 | 203 | 89 | |
| | 5-1-44 | | | | | 7.3 | 2249 | 295 | tr. | 215 | 116 | 64 | 25 | 1010 | 215 | 172 | 191 | |
| | 10-23-44 | | | | | 7.9 | 2320 | 299 | sl. | 240 | 128 | 32 | 24 | 1010 | 233 | 174 | 211 | |
| | 4-30-45 | | | | | 7.5 | 1965 | 297 | lgt. | 215 | 96 | 40 | 21 | 869 | 195 | 140 | 123 | |
| Larimer County | | | | | | | | | | | | | | | | | | |
| 11 | 11-13-43 | | | 25 | 52 | 7.5 | 991 | 113 | tr. | 118 | 38 | 20 | 19 | 401 | 135 | 55 | 82 | |
| | 5-9-44 | | | | | 7.7 | 1000 | 103 | 0 | 114 | 25 | 40 | 27 | 394 | 134 | 54 | 131 | |
| | 11-26-44 | | | | | 8.1 | 992 | 111 | sl. | 120 | 27 | 32 | 21 | 379 | 136 | 54 | 94 | |
| | 5-18-45 | | | | | 7.5 | 942 | 127 | sl. | 106 | 27 | 24 | 22 | 379 | 131 | 49 | 65 | |
| 73 | 5-19-44 | | | 28 | 36 | 7.7 | 2694 | 376 | 0 | 180 | 30 | 96 | 13 | 1386 | 388 | 187 | 114 | |
| | 11-26-44 | | | | | 7.7 | 2286 | 304 | tr. | 48 | 28 | 64 | 20 | 1184 | 274 | 157 | 153 | |

| Sample | Date | Stream Flow c.f.s. | Reservoir Contents ac. ft. | Well Depth to Water ft. | Well Depth of Well ft. | pH | Total Solids p.p.m. | Vol. Solids p.p.m. | Organic | $CO_3$ ppm | Cl ppm | $NO_3$ ppm | $SiO_2$ ppm | $SO_4$ ppm | Ca ppm | Mg ppm | Na ppm | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Big Thompson<br>Larimer County | | | | | | | | | | | | | | | | | | |
| 54 | 11-26-43 | | | 7 | 24 | 8.1 | 708 | 70 | sl. | 98 | 8 | 0 | 12 | 305 | 134 | 96 | 35 | |
| | 4-24-44 | | | | | 7.3 | 827 | 63 | tr. | 108 | 10 | 0 | 12 | 349 | 119 | 53 | 42 | |
| | 11-7-44 | | | | | 7.5 | 838 | 56 | lgt. | 145 | 18 | 0 | 15 | 358 | 163 | 40 | 33 | |
| | 5-10-45 | | | | | 7.3 | 954 | 92 | lgt. | 120 | 22 | 0 | 16 | 470 | 183 | 48 | 45 | |
| Weld County | | | | | | | | | | | | | | | | | | |
| 18 | 11-15-43 | | | 10E | 15 | 7.7 | 1631 | 195 | tr. | 150 | 28 | 28 | 17 | 700 | 167 | 86 | 163 | |
| | 4-24-44 | | | | | 7.7 | 1431 | 163 | sl. | 120 | 26 | 20 | 14 | 719 | 151 | 82 | 156 | |
| | 11-10-44 | | | | | 7.9 | 1370 | 168 | tr. | 132 | 32 | 16 | 19 | 700 | 126 | 81 | 146 | |
| | 5-10-45 | | | | | 7.3 | 1484 | 221 | lgt. | 132 | 32 | 14 | 13 | 772 | 172 | 83 | 93 | |
| Wells - St. Vrain<br>Boulder County | | | | | | | | | | | | | | | | | | |
| 78 | 5-16-44 | | | 8 | 60 | 7.5 | 4683 | 426 | 0 | 155 | 20 | 8 | 9 | 2814 | 511 | 355 | 286 | |
| | 11-1-44 | | | | | 7.3 | 5047 | 561 | tr. | 180 | 40 | 16 | 16 | 2999 | 475 | 400 | 312 | |
| | 6-1-45 | | | | | 7.3 | 4619 | 578 | sl. | 168 | 52 | 8 | 12 | 2691 | 504 | 326 | 217 | |
| Weld County | | | | | | | | | | | | | | | | | | |
| 77 | 5-16-44 | | | 28 | 35 | 7.5 | 1191 | 152 | tr. | 240 | 15 | 4 | 18 | 472 | 96 | 110 | 135 | |
| | 11-1-44 | | | | | 7.5 | 1156 | 164 | sl. | 240 | 18 | 16 | 20 | 511 | 63 | 111 | 128 | |
| | 4-11-45 | | | 32 | | 7.7 | 1174 | 162 | sl. | 252 | 22 | tr. | 18 | 473 | 88 | 102 | 102 | |
| 76 | 5-16-44 | | | 6E | 30 | 7.9 | 4438 | 602 | lgt. | 168 | 118 | 0 | 9 | 2413 | 336 | 294 | 448 | |
| | 5-5-45 | | | | | 7.2 | 1845 | 247 | lgt. | 145 | 76 | 4 | 10 | 919 | 148 | 121 | 188 | |
| 34 | 11-15-43 | | | 15 | 26 | 8.2 | 525 | 40 | tr. | 132 | 40 | tr | 24 | 132 | 70 | 72 | 62 | |
| | 4-24-44 | | | | | 7.9 | 567 | 45 | tr. | 120 | 44 | 20 | 22 | 164 | 79 | 29 | 68 | |
| | 11-7-44 | | | | | 7.7 | 545 | 36 | sl. | 120 | 42 | 20 | 24 | 146 | 75 | 25 | 66 | |
| | 5-5-45 | | | | | 7.7 | 551 | 65 | sl. | 108 | 42 | 32 | 27 | 158 | 68 | 24 | 43 | |
| Wells - Lone Tree Creek<br>Weld County | | | | | | | | | | | | | | | | | | |
| 9 | 11-12-43 | | | 25E | 35 | 7.9 | 400 | 54 | - | 108 | 14 | 80 | 17 | 34 | 76 | 13 | 24 | |
| | 5-5-44 | | | | | 7.7 | 398 | 43 | 0 | 95 | 14 | 64 | 27 | 46 | 80 | 11 | tr. | |
| | 10-27-44 | | | | | 7.7 | 396 | 39 | sl. | 108 | 16 | 64 | 19 | 53 | 81 | 14 | 22 | |
| | 5-17-45 | | | | | 7.3 | 410 | 53 | lgt. | 108 | 18 | 70 | 23 | 48 | 90 | 11 | 24 | |
| 8 | 11-12-43 | | | 27 | 35 | 8.0 | 431 | 41 | tr. | 138 | 28 | tr. | 23 | 60 | 86 | 15 | 32 | |
| | 5-5-44 | | | | | 7.5 | 420 | 33 | lgt. | 120 | 22 | 32 | 26 | 55 | 84 | 13 | 27 | |
| | 10-27-44 | | | | | 7.9 | 394 | 25 | sl. | 120 | 24 | 32 | 22 | 54 | 82 | 14 | 27 | |
| | 5-17-45 | | | | | 7.7 | 419 | 34 | lgt. | 120 | 24 | 36 | 23 | 72 | 94 | 12 | 30 | |

| Sample | Date | Stream Flow c.f.s. | Reservoir Contents ac. ft. | Well Depth to Water ft. | Well Depth of Well ft. | pH | Total Solids p.p.m. | Vol. Solids p.p.m. | Organic | $CO_3$ ppm | Cl ppm | $NO_3$ ppm | $SiO_2$ ppm | $SO_4$ ppm | Ca ppm | Mg ppm | Na ppm | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Weld County | | | | | | | | | | | | | | | | | | |
| 24 | 11-12-43 | | | 10 | | 7.9 | 614 | 42 | tr. | 168 | 14 | tr. | 10 | 198 | 57 | 24 | 80 | |
| | 5-5-44 | | | | | 7.7 | 610 | 39 | 0 | 132 | 14 | 4 | 26 | 181 | 94 | 23 | 69 | |
| | 10-27-44 | | | | | 7.9 | 547 | 36 | sl. | 145 | 20 | tr. | 18 | 176 | 77 | 20 | 74 | |
| | 5-17-45 | | | | | 7.7 | 635 | 50 | lgt. | 155 | 20 | 4 | 26 | 206 | 111 | 24 | 62 | |
| 25 | 11-12-43 | | | 28 | 38 | 7.9 | 700 | 69 | tr. | 192 | 14 | 24 | 20 | 185 | 130 | 26 | 50 | |
| | 10-27-44 | | | | | 7.7 | 631 | 48 | sl. | 155 | 20 | 32 | 47 | 169 | 116 | 24 | 39 | |
| | 5-17-45 | | | | | 7.6 | 642 | 3959 | sl. | 155 | 22 | 32 | 24 | 173 | 137 | 21 | 45 | |
| 32 | 11-15-43 | | | 27 | 40 | 8.1 | 1102 | 98 | tr. | 168 | 24 | tr. | 33 | 463 | 146 | 47 | 41 | |
| | 5-5-44 | | | | | 7.5 | 1145 | 111 | tr. | 145 | 22 | 28 | 24 | 458 | 167 | 49 | 88 | |
| | 10-27-44 | | | | | 7.9 | 1033 | 92 | lgt. | 155 | 28 | 24 | 26 | 442 | 153 | 41 | 81 | |
| | 5-10-45 | | | | | 7.9 | 1181 | 128 | lgt. | 155 | 18 | 32 | 27 | 523 | 183 | 46 | 66 | |
| 31 | 11-12-43 | | | 12 | 28 | 7.7 | 1427 | 147 | tr. | 180 | 42 | 12 | 23 | 662 | 220 | 57 | 111 | |
| | 5-5-44 | | | | | 7.5 | 1356 | 134 | tr. | 145 | 30 | 4 | 31 | 614 | 198 | 55 | 110 | |
| | 10-26-44 | | | | | 7.7 | 1374 | 134 | sl. | 145 | 48 | 12 | 29 | 625 | 206 | 54 | 110 | |
| | 5-10-45 | | | | | 7.7 | 1376 | 157 | sl. | 145 | 46 | 28 | 28 | 644 | 208 | 52 | 82 | |
| Wells - Crow Creek | | | | | | | | | | | | | | | | | | |
| Weld County | | | | | | | | | | | | | | | | | | |
| 27 | 11-12-43 | 12 | 50 | | | 7.6 | 1444 | 73 | tr. | 180 | 34 | 16 | 31 | 684 | 118 | 42 | 229 | |
| | 5-5-44 | | | | | 7.7 | 1365 | 77 | tr. | 168 | 30 | 20 | 40 | 650 | 107 | 40 | 263 | |
| | 10-27-44 | | | | | 8.1 | 1397 | 74 | sl. | 155 | 46 | 16 | 36 | 594 | 88 | 33 | 260 | |
| | 5-17-45 | | | | | 7.8 | 1503 | 106 | lgt. | 145 | 44 | 32 | 36 | 702 | 137 | 45 | 140 | |
| Wells - Box Elder Creek | | | | | | | | | | | | | | | | | | |
| Adams County | | | | | | | | | | | | | | | | | | |
| 22 | 11-16-43 | 16 | 50E | | | 7.3 | 259 | 18 | tr. | 83 | 12 | tr. | 21 | 30 | 52 | 8 | 18 | |
| | 4-7-44 | | | | | 7.3 | 278 | 18 | sl. | 78 | 12 | 4 | 31 | 40 | 50 | 9 | 10 | |
| | 11-7-44 | | | | | 7.5 | 279 | 22 | tr. | 85 | 16 | tr. | 17 | 44 | 56 | 8 | 18 | |
| | 5-4-45 | | | | | 7.5 | 282 | 20 | sl. | 95 | 18 | 4 | 21 | 48 | 59 | 8 | 17 | |
| Weld County | | | | | | | | | | | | | | | | | | |
| 82 | 11-3-44 | 9 | 63 | | | 7.3 | 781 | 61 | tr. | 168 | 72 | 24 | 25 | 277 | 121 | 22 | 84 | |
| Wells-Prospect Valley | | | | | | | | | | | | | | | | | | |
| Weld County | | | | | | | | | | | | | | | | | | |
| 83 | 11- -44 | 98 | 171 | | | 7.7 | 369 | 25 | | 72 | 20 | 1 | 22 | 106 | 63 | 10 | 37 | |
| 35 | 11-18-43 | 59 | 86 | | | 8.0 | 1003 | 84 | tr. | 120 | 58 | tr. | 18 | 432 | 184 | 80 | 74 | |
| | 4-26-44 | | | | | 7.7 | 998 | 70 | tr. | 120 | 64 | 14 | 24 | 418 | 140 | 46 | 68 | |
| | 11-8-44 | | | | | 7.9 | 1006 | 58 | sl. | 108 | 68 | 16 | 23 | 482 | 184 | 29 | 73 | |
| | 5-3-45 | | | | | 7.8 | 1226 | 118 | sl. | 120 | 84 | 16 | 19 | 550 | 231 | 33 | 69 | |

| Sample | Date | Stream Flow c.f.s. | Reservoir Contents ac. ft. | Well Depth to Water ft. | Well Depth of Well ft. | pH | Total Solids p.p.m. | Vol. Solids p.p.m. | Organic | $CO_3$ ppm | Cl ppm | $NO_3$ ppm | $SiO_2$ ppm | $SO_4$ ppm | Ca ppm | Mg ppm | Na ppm | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Weld County** | | | | | | | | | | | | | | | | | | |
| 84 | 11- -44 | | | 21 | 84 | 7.3 | 2191 | 366 | | 84 | 160 | 4 | 27 | 1000 | 329 | 60 | 2 | |
| 58 | 4-26-44 | | | 6 | 80 | 7.6 | 440 | 30 | tr. | 95 | 8 | 4 | 13 | 143 | 71 | 16 | 36 | |
| | 11-28-44 | | | | | 7.7 | 411 | 23 | tr. | 85 | 12 | tr. | 17 | 143 | 66 | 14 | 36 | |
| | 5-3-45 | | | | | 7.7 | 412 | 30 | sl. | 85 | 14 | 4 | 14 | 142 | 77 | 14 | 32 | |
| **Wells - Kiowa Creek** | | | | | | | | | | | | | | | | | | |
| **Morgan County** | | | | | | | | | | | | | | | | | | |
| 39 | 11-18-43 | | | 54 | | 7.7 | 519 | 20 | tr. | 132 | 14 | 0 | 24 | 163 | 67 | 12 | 73 | |
| | 5-1-44 | | | | | 7.7 | 471 | 15 | tr. | 120 | 12 | 0 | 14 | 142 | 69 | 9 | 73 | |
| | 10-26-44 | | | | | 7.7 | 526 | 19 | tr. | 120 | 16 | 0 | 21 | 187 | 75 | 10 | 46 | |
| | 4-30-45 | | | | | 7.6 | 467 | 15 | sl. | 120 | 16 | 0 | 17 | 149 | 67 | 7 | 53 | |
| **Wells - Bijou Creek** | | | | | | | | | | | | | | | | | | |
| **Arapahoe County** | | | | | | | | | | | | | | | | | | |
| 56 | 4-7-44 | | | 8 | 21 | 7.7 | 1977 | 143 | lgt. | 108 | 33 | 26 | 19 | 1006 | 228 | 58 | 243 | |
| | 6-15-45 | | | | | 8.0 | 1843 | 153 | sl. | 120 | 30 | 32 | 17 | 1126 | 201 | 48 | 196 | |
| **Adams County** | | | | | | | | | | | | | | | | | | |
| 37 | 11-18-43 | | | 30 | 87 | 7.5 | 649 | 33 | sl. | 120 | 14 | 0 | 20 | 268 | 103 | 15 | 70 | |
| | 5-1-44 | | | | | 7.3 | 714 | 37 | tr. | 120 | 20 | 6 | 29 | 284 | 113 | 13 | 30 | |
| | 10-26-44 | | | | | 7.5 | 577 | 31 | lgt. | 108 | 12 | 4 | 22 | 244 | 89 | 13 | 45 | |
| | 5-3-45 | | | | | 7.1 | 714 | 37 | sl. | 120 | 20 | tr. | 19 | 301 | 116 | 11 | 53 | |
| 38 | 11-18-43 | | | 48 | 58 | 7.7 | 696 | 46 | tr. | 120 | 16 | 0 | 92 | 214 | 99 | 17 | 57 | |
| | 5-1-44 | | | | | 7.7 | 563 | 30 | tr. | 108 | 12 | 0 | 22 | 214 | 97 | 15 | 55 | |
| | 10-23-44 | | | | | 7.9 | 557 | 26 | sl. | 108 | 22 | 0 | 19 | 211 | 100 | 22 | 53 | |
| | 5-3-45 | | | | | 7.7 | 563 | 30 | sl. | 108 | 16 | 0 | 19 | 217 | 98 | 12 | 42 | |
| 81 | 10-26-44 | | | 55 | 160 | 8.1 | 971 | 53 | tr. | 108 | 18 | 0 | 22 | 480 | 123 | 27 | 137 | |
| | 5-3-45 | | | | | 7.7 | 1013 | 77 | tr. | 120 | 20 | 0 | 19 | 488 | 133 | 26 | 106 | |
| **Wells - Beaver Creek** | | | | | | | | | | | | | | | | | | |
| **Morgan County** | | | | | | | | | | | | | | | | | | |
| 67 | 5-4-44 | | | 33 | 70 | 7.9 | 1937 | 247 | tr. | 132 | 20 | 40 | 44 | 995 | 277 | 97 | 99 | |
| | 10-24-44 | | | | | 7.9 | 2145 | 202 | tr. | 155 | 24 | 32 | 25 | 1152 | 321 | 105 | 134 | |
| | 5-1-45 | | | | | 7.6 | 2200 | 271 | sl. | 155 | 26 | 32 | 17 | 1146 | 348 | 102 | 139 | |
| **Latham Drain near LaSalle** | | | | | | | | | | | | | | | | | | |
| 16 | 11-15-43 | 16E | | | | 8.3 | 792 | 68 | tr. | 150 | 56 | 24 | 17 | 259 | 106 | 34 | 94 | |
| | 4-28-44 | 16E | | | | 8.1 | 797 | 62 | tr. | 120 | 64 | 20 | 20 | 254 | 90 | 42 | 33 | |
| | 11-10-44 | 18E | | | | 8.0 | 763 | 65 | tr. | 145 | 60 | 24 | 24 | 271 | 93 | 35 | 85 | |
| | 5-10-45 | 18E | | | | 7.9 | 746 | 88 | sl. | 132 | 72 | 20 | 15 | 259 | 108 | 28 | 65 | |
| **Smith Drain** | | | | | | | | | | | | | | | | | | |
| 79 | 5-16-44 | | | | | 7.9 | 2277 | 253 | tr. | 132 | 22 | 10 | 14 | 1273 | 278 | 146 | 160 | |
| | 11-1-44 | | | | | 7.5 | 1966 | 228 | sl. | 120 | 24 | 0 | 17 | 1105 | 262 | 116 | 121 | |
| | 6-1-45 | | | | | 7.3 | 2181 | 255 | sl. | 120 | 30 | 12 | 14 | 1177 | 263 | 127 | 162 | |


LARIMER
WELD
LOGAN
SEDGWICK
PHILLIPS
MORGAN
WASHINGTON
BOULDER
ADAMS
ARAPAHOE
JEFFERSON
DENVER
Ft. Collins
Greeley
Brighton
Sterling
Julesburg
Ft. Morgan
SURFACE WATER ANALYSES
Streams
Reservoirs
Total solids p.p.m.
0 - 500
500-1000
1000-1500
1500-2000
over 2000


LARIMER
WELD
LOGAN
SEDGWICK
PHILLIPS
MORGAN
WASHINGTON
BOULDER
JEFFERSON
ADAMS
ARAPAHOE
DENVER
Ft. Collins
Greeley
Brighton
Sterling
Julesburg
Ft. Morgan
WELL WATER ANALYSES
Total Solids p.p.m.
0 - 500
500 - 1000
1000 - 1500
1500 - 2000
2000 - 2500
Over 2500